If original cost is used, prices will be too low, because cable operators will be denied a return on an important component of their investment. Thus, cable operators will lack sufficient incentives to make efficient investments, and consumers will be injured.

The use of original cost could have particularly serious financial consequences for the cable industry. Many cable systems changed hands in the late 1980s at prices far in excess of the book value of the assets acquired. The difference between the seller's book value and the acquirer's price was allocated for accounting purposes in varying proportions to a write-up of tangible asset value, to amortizable franchise and subscriber list values, and to goodwill. If the FCC excludes all of this from the rate base, it will deprive these systems of a large part of their asset values that is not attributable to monopoly rents. The practical result may be that some systems' earnings fall by so much that they will be unable to service their debt.

This problem is not limited to those systems that recently changed hands, it affects all systems. Systems that did not change hands nevertheless have a market value that in all probability exceeds book value. To use original cost to value such systems is to deprive them of property value that has no connection to monopoly profits. Cable systems that did not recently change hands should be allowed to earn a return on the large part of the difference between their market and book values that is not attributable to monopoly rents. Failure to do this is likely to affect cable operators' and capital markets' expectation about the future course of regulation. The result will be inefficient underinvestment in this important communications infrastructure industry.

This paper describes an alternative to original cost—competitive market value. The market value of a cable system is equivalent to the discounted present value of the cash flow expected by its owners. The competitive market value is the market value net of the discounted present value of any monopoly rents that the firm might earn were there no effective competition. This paper describes how the Commission can estimate competitive market values for use in cost-of-service rate making and will show that original cost is not an accurate measure of competitive market value.

II. Competitive market value is a superior way to value a rate base

Competitive market value is superior to any of the four approaches to rate base valuation listed in ¶33 of the Notice of Proposed Rulemaking: original cost, replacement cost, reproduction cost, and market value. The original cost method usually underestimates the true value of a firm's tangible assets, because it values those assets at the time of purchase, which might have been many years in the past. Replacement and reproduction cost methods attempt to correct this deficiency. These methods, however, share a second and potentially more serious problem with the original cost method; they omit intangible assets.

A cable system cannot effectively conduct its business without intangible assets, including customer goodwill, contracts, technical expertise, and a skilled management team. Yet a cable system's balance sheet often omits its investments in these assets. Under Generally Accepted Accounting Principles, investments in intangible assets are usually charged to current expenses, so the balance sheet shows only investments in tangible assets. Intangible assets only appear on a company's books, if they are captured through the accident of a transaction.[3] Thus, original, reproduction, or replacement cost methods of valuing the rate base risk ignoring these important assets. Denying cable operators the value of their investments in intangibles would effectively constitute the confiscation of that investment.

The market value methodology avoids both these problems, because a firm's market value reflects the current value to a purchaser of all the firm's assets. The best measure of the economic value of any asset is its market price. The market price of an asset reflects in summary form all the various

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3 A rate base based on balance sheet valuations derived from purchase accounting might seem to avoid these problems. Purchase accounting attempts to correct for the deficiencies of accounting methods of valuing assets by entering the assets of an acquired business on the purchaser's balance sheet at their acquisition cost. The difference between the acquisition cost of the firm and the value of its tangible assets is recorded as intangible assets. See *GAAP Guide 1993*, pp. 3.02-3.07 and 21.01-21.05. Purchase accounting valuations, however, are subject to the same objections that are discussed below for market value rate bases: they are unavailable for systems that have not recently been sold and they might include the discounted present value of monopoly rents.

economic signals and incentives that determine the supply of and demand for the underlying service.

Competitive market value is the market value of a system that is charging competitive rates. Competitive market value can be used to determine rate bases in the cable industry, because the industry contains many systems that are effectively competitive. The experience of these systems can be used to project benchmark competitive market value rate bases of other firms, just as the Commission used them to project benchmark rates. Furthermore, the Commission can also rely on the experience of firms charging rates permitted under the benchmark method of rate regulation. Those rates approximate competitive rates in a way that the Commission has found acceptable under its benchmark approach.

III. Methods of estimating competitive market values[4]

The Commission can estimate competitive market values directly from the prices paid in market transactions for systems charging competitive rates: effectively competitive or benchmark regulated systems. Alternatively, the Commission can estimate competitive market values using the discounted present values of the cash flows from these systems. Buyers of cable systems determine the price that they are willing to pay based on these discounted present values.

Estimating competitive market values based on the acquisition prices of systems that either are effectively competitive or that are charging benchmark rates would require the Commission first to collect data on the prices at which those systems were bought and sold. An adequate amount of such data is currently unavailable. There are few effectively competitive systems that have been sold recently. Furthermore, benchmark regulation is just beginning, so there are no data available on sales of benchmark regulated systems. As experience with benchmark regulation grows,

4 A paper by the Brattle Group, "Rate Base Issues in Cable Television Cost-of-Service Regulation," August 25, 1993, attached to the Comments of Viacom International Inc. also proposes the use of competitive market value as the rate base and presents two methodologies for establishing the competitive market value of a system.

however, more data on selling prices of benchmark regulated systems will likely become available. These data are likely to be available in time to evaluate cost-of-service-based rates in formal proceedings.

Given adequate data, the Commission could model the market value of effectively competitive and benchmark systems as a function of a number of the systems' observable characteristics. The set of characteristics included in this model should be more extensive than those used to calculate benchmark rates. A system will turn to cost-of-service regulation if it cannot operate efficiently under the benchmark rates. Such a system presumably has characteristics that make its costs, and thus perhaps its market value, different from most systems, but that are not captured in the benchmark model. Once the relevant data are available, the Commission can experiment to see which characteristics belong in the model. The Commission can then put information on the relevant characteristics of cost-of-service regulated systems into the model to estimate their benchmark competitive market value.

While public data on selling prices are not yet available, the Commission can nevertheless measure the market values of effectively competitive and benchmark-regulated systems. The Commission can measure the market values of these systems by projecting their future cash flow, and then calculating the discounted present value of that flow. The advantage of this method is that it does not require a sufficient number of acquisitions of effectively competitive or benchmark regulated systems. This method would require the Commission to collect data on systems' current cash flow and on conditions likely to affect changes in their cash flow. The Commission could then estimate market values, which it then could use in the same way as the acquisition prices discussed in the previous paragraph.

IV. An example of competitive market value

This section gives examples of the estimation of competitive market value, and demonstrates that competitive market value is likely to be significantly greater than original cost. The Commission's cable TV rate survey excluded cash flow and data on expenses, which might be used to derive cash flow. Therefore, this section will concentrate on data from those few multiple system operators that are publicly held and that have no significant activities other than operating cable systems. While these operators are only a small part of the industry, they provide a useful example of how various methods of measuring the rate base might work. Data from the Commission's survey will be used to ensure that the cash flow of these operators excludes monopoly rents.

Competitive market value is the present value of a competitive system's discounted expected future cash flow. Future cash flow will be estimated based on current cash flow, but current cash flow will reflect some rates that are above the benchmark recently established by the Commission. Therefore, the cash flow of these systems will be adjusted to reflect the effects of changing their rates to benchmark levels. If the Commission institutes competitive market value rate bases, it will be able to base such adjustments on the actual experience of benchmark regulated firms. Because benchmark regulation has not yet become effective, however, this paper adjusts cash flow using a number of assumptions concerning systems' plausible responses to regulation.

Pre-regulation cash flow is adjusted under two scenarios: (1) the decline in rates does not increase the number of subscribers or lead subscribers to take additional services, and (2) the decline in rates causes more consumers to subscribe to cable. In the first case, benchmark rates are calculated for each system in the Commission's cable survey that is not effectively competitive, and its regulated revenues are calculated on the assumption that it charges benchmark rates and experiences no increase in subscribers. (The systems whose current rates are already below the benchmark levels are assumed not to change rates.) In the second case, systems' regulated revenues are calculated on the assumption that the percentage increase in their subscribers is 2.2 times the percentage decrease in their rates.[5]

5 The elasticity of demand for cable, the ratio of the percentage change in quantity demanded to the percentage change in price, was recently estimated at 2.2. Bruce M. Owen and Steven S. Wildman, *Video Economics*, Harvard University Press, Cambridge Mass., 1992, p. 231. The number of subscribers is not allowed to exceed the number of homes passed. Subscribers are assumed not to increase the number of services that they subscribe to. That assumption lowers the estimated competitive market values.

Total revenues decrease by 5 percent in the first scenario and rise by 3 percent in the second.

In the scenario where the number of subscribers is unchanged, costs are assumed also to be unchanged and the change in cash flow is simply the change in revenue. In the scenario where the number of subscribers increases, however, operating expenses are assumed to increase by the same percentage amount as the number of subscribers. The change in cash flow then is equal to the change in revenue minus the change in costs. Table 1 shows the total cash flow of the five system operators under both scenarios. The assumptions used to determine cash flow may appear problematic, but those assumptions will not be necessary in the future. Determining competitive market value will be much easier for the Commission, once it can draw on the actual changes in revenues and expenses experienced by benchmark regulated systems.

Table 1: Cable Operators' Estimated Cash Flow Under Various Regulatory Scenarios[6]

		Cash Flow	
	Pre-Regulation	**Scenario 1**	**Scenario 2**
5 Companies	$463,607,010	$376,965,124	$434,533,263

Calculating market value requires projecting future cash flow. In an actual rate base proceeding, the Commission can consider evidence concerning system specific factors that might lead cash flow to change in the future. For purposes of this exercise, however, operators' cash flow will be assumed to grow at a constant rate in perpetuity. Under this assumption, a

6 Data are for the last fiscal year for which the firm filed a 10-K with the Securities and Exchange Commission. The ending dates of these fiscal years are Adelphia, March 31, 1993, American Television and Communication Corp., December 31, 1991, Falcon Cable Systems, December 31, 1992, Galaxy Cablevision, December 31, 1992, and TCA, October 31, 1992. American Television and Communication Corp. was recently acquired and no longer files an independent 10-K.

system's market value is equal to m times its cash flow, where $m = 1/(i - g)$, g is the growth rate of cash flow, and i is the market interest rate. This example assumes an interest rate of 11.25 percent. The Commission uses that rate when calculating equipment costs under benchmark regulation. To give a conservative estimate of market value, the growth rate will be assumed to be zero. While cable systems have been growing significantly in recent years, this assumption allows for the possibility that regulation will slow their growth. These assumptions result in a multiple of 8.89, which is somewhat lower than the acquisition price to cash flow multiples that have been seen in most recent acquisitions of cable systems.[7]

Multiplying the estimated cash flow numbers in Table 1 by 8.89 produces the competitive market value of the operators' equity only, because cash flow was measured net of interest payments on debt. To estimate competitive market value of the entire firm, which corresponds to an asset rate base, the book value of total liabilities, excluding shareholders' equity and current liabilities, is added to the calculated value of equity. Table 2 shows the resulting estimates of competitive market value.

Table 2: Cable Operators' Original Cost Rate Base and Estimated Competitive Market Values Under Various Regulatory Scenarios[8]

	Original Cost	Competitive Market Value	
		Scenario 1	Scenario 2
5 Companies	$1,813,369,077	$6,578,136,419	$7,089,853,214

Table 2 also shows estimates of the total original cost rate base of these cable operators. Original cost rate bases were estimated by adding working

7 Estimates of cash flow multiples in large cable acquisitions are in Paul Kagan and Associates Inc., *The Cable TV Financial Databook*, June 1993, pp. 131-134.

8 Data on original cost are from the same sources as Table 1.

capital, defined as the difference between current assets and current liabilities, to plant, property, and equipment net of depreciation. As can be seen, competitive market value greatly exceeds original cost. Table 3 shows the ratio of competitive market value to original cost. The ratios ranged from 2.4 to 6.7 and the average competitive market value of these firms is slightly less than 4 times the average original cost.

Table 3: The Ratio of Competitive Market Value to Original Cost for Cable Operators

	Ratio	
	Scenario 1	**Scenario 2**
5 Companies	3.6	3.9

Requiring a rate base that is so far below the competitive market values of cable systems can seriously harm the cable industry. Given the estimated original cost rate bases and the 14% rate of return contemplated in ¶21 of the Notice of Proposed Rulemaking, Table 4 compares the overall revenue requirement, which is net of operating expenses, to overall interest payments. For three of the five companies, and for the group as a whole, the returns allowed on the original cost rate base would be less than their interest payments. Thus, with an original cost rate base, not only would cable companies earn an inadequate return on their investment, they would be unable to service their debt.

Table 4: Cable Operators' Estimated Revenue Requirements Using an Original Cost Rate Base and Their Interest Payments[9]

	Revenue Requirement	Interest Payments	Difference
5 Companies	$253,871,671	$262,053,126	($8,181,455)

9 Data on interest payments are from the same sources as Table 1.

V. Conclusion

Competitive market value is a way to measure the rate base that does not ignore important intangible assets or include the present value of monopoly rents in the rate base. Further, competitive market value provides efficient signals for investment and investor expectations consistent with economically efficient development of the industry. Original cost is a seriously inadequate way to measure a cable system's rate base. Estimates of competitive market value for a group of multiple system operators show that original cost does not adequately approximate competitive market value.